



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/081,385  | 02/20/2002  | Takenori Hirose      | 16869P-042900US     | 9702             |
| 20350   | 7590        | 06/15/2004           | EXAMINER            |                  |
| TOWNSEND AND TOWNSEND AND CREW, LLP<br>TWO EMBARCADERO CENTER<br>EIGHTH FLOOR<br>SAN FRANCISCO, CA 94111-3834 |             |                      | LEE, HWA S          |                  |
|   |             |                      | ART UNIT            | PAPER NUMBER     |
|   |             |                      | 2877                |                  |

DATE MAILED: 06/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/081,385

Applicant(s)

HIROSE ET AL.

Examiner

Andrew H. Lee

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) 29-38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

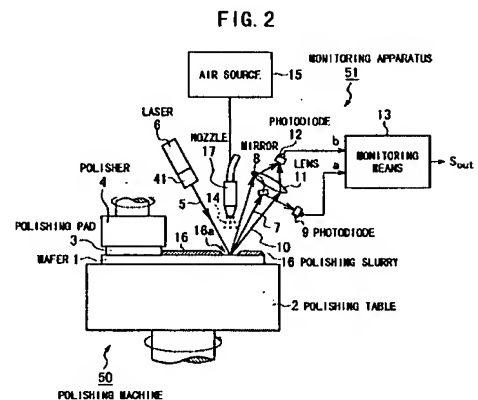
**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### ***Election/Restrictions***

### ***Claim Rejections - 35 USC § 102***

determining the thickness of said optically transparent film using spectral waveform information for the reflected light thus detected (column 19, last paragraph);



Art Unit: 2877

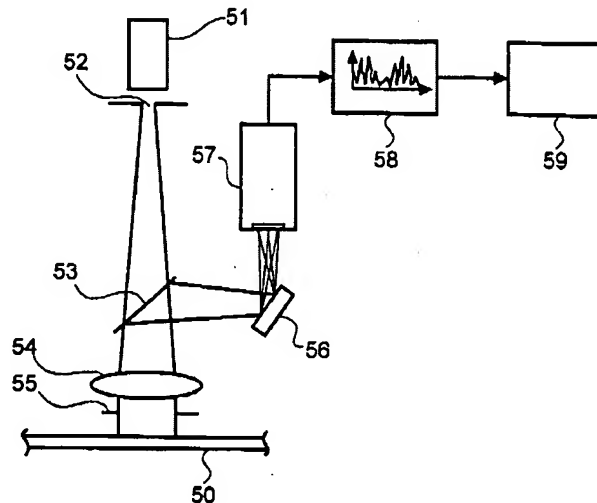
wherein surface area ratio information for said pattern within the detection field of view of said optical system is used in the step of determining the thickness of said optically transparent film (column 19, last paragraph).

As for claim 13, Takeishi shows that a halogen lamp may be used thus having a waveband of 400-800nm (column 6, lines 42+).

4. **Claims 3-6, 8, 9, 10, 18 19, and 24-28** are rejected under 35 U.S.C. 102(a) as being anticipated by Kakuchi et al (US 5,087,121).

Kakuchi et al (Kakuchi hereinafter) show a depth/height measuring device comprising:

irradiating light onto a sample in which a plurality of layers of films are formed and the surface thereof is covered by an optically transparent thin film;



detecting the reflected light generated by said sample due to the irradiation of said light, by means of an optical system; and

determining the thickness of said optically transparent film using spectral waveform information for the reflected light thus detected;

wherein, in the step of determining the thickness of said optically transparent film, regional models having a plurality of layer structures are established, the waveforms of the reflected light from said regional models are calculated, and the thickness of said optically

Art Unit: 2877

transparent film is determined by fitting, using said calculated waveform information and the spectral waveform information of the detected reflected light;

wherein, in the step of determining the thickness of said optically transparent film, a regional model is established which takes into account a region where the reflected light from said pattern and the reflected light from the layer beneath said pattern are mixed, the waveform of the reflected light from the regional model thus established is calculated, and the thickness of the optically transparent film covering said pattern is determined using the waveform information thus calculated and the spectral waveform information of said detected reflected light.

wherein, in the step of measuring said film thickness, measurement points are determined using spectral data from said detected reflected light;

wherein said film thickness calculating means establishes a regional model comprising a plurality of layer structures calculates the waveform of the reflected light from said regional model, and determines the thickness of said optically transparent film by fitting, using the waveform information thus calculated and the spectral waveform information of the detected reflected light.

As for the light source, Kakuchi shows the light source as a white light source thus having a waveband of 400-800nm.

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2877

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 2 and 7** rejected under 35 U.S.C. 103(a) as being unpatentable over Takeishi and Kakuchi respectively.

Takeishi nor Kakuchi does not expressly say that the patterns have a width of the pattern is 1  $\mu\text{m}$  or smaller but the size of such pattern are notoriously well known in the art to be 1  $\mu\text{m}$  or smaller since measurements are often made in Angstroms.

7. **Claim 11** is rejected under 35 U.S.C. 103(a) as being unpatentable over Kakuchi as applied to claim 8 above, and further in view of Takeishi.

Kakuchi does not expressly teach the determination of the thickness of the thin film using the surface ratio.

Takeishi teaches that as the spectral content no longer changes, it indicates that the surface ratio of the remaining metal layer and the exposed dielectric layer does not change indicating the layer is substantially removed thus indicating that the constant surface ratio shows that the thickness is zero. Therefore, one of ordinary skill in the art would have modified Kakuchi with Takeish in order to determine the endpoint of etching.

Papers related to this application may be submitted to Technology Center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the PTO Fax Center located in CP4-4C23. The faxing of such papers must conform with the notice published in the Official

Art Unit: 2877

Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Center number is 703-872-9306 for regular communications and for After Final communications.

If the Applicant wishes to send a Fax dealing with either a Proposed Amendment or for discussion for a phone interview then the fax should:

a) Contain either the statement "DRAFT" or "PROPOSED AMENDMENT" on the Fax Cover Sheet; and

b) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Hwa Lee whose telephone number is (571) 272-2419.

The examiner can normally be reached on M-Th. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on (571) 272-2415.

A handwritten signature in black ink, appearing to read 'Andrew Lee', with a large, stylized loop at the beginning and a horizontal line extending to the right.

Andrew Lee  
Patent Examiner  
Art Unit 2877

June 12, 2004/ahl